CLAIMS

What is claimed is:

1. A method for data redundancy in a data storage system, comprising:

a) grouping a plurality of disk drives into a plurality of arrays having data redundancy to optimize performance, and

b) for every failure of one of said plurality of arrays due to a failed disk drive, dynamically creating a new array having data redundancy in said plurality of arrays and that is optimized for performance, said new array containing information from said failed disk drive.

2. The method for data redundancy as described in Claim 1, wherein b) comprises:

b1) upon failure of a first array in said plurality of arrays due to said first failed disk drive, dynamically choosing a second array in said plurality of arrays that has the smallest number of disk drives as between the remaining arrays, said second array having redundancy;

b2) combining disk drives from said first array, excluding said first failed disk drive, with disk drives from said second array to dynamically form said new array in a RAID configuration having data redundancy in said plurality of arrays.

3. The method of data redundancy as described in Claim 1, wherein b) comprises:

dynamically creating said new array having data redundancy in said plurality of arrays that is optimized for performance.

4. The method of data redundancy as described in Claim 2, further comprising:

configuring said new array in a RAID-4 configuration.

5. The method of data redundancy as described in Claim 2, further comprising:

configuring said new array in a RAID 5 configuration.

6. The method for data redundancy as described in Claim 1, wherein said plurality of disk drives comprise spare disks and wherein a) comprises:

maximizing the number of arrays in said plurality of arrays that are mirrored pairs of disk drives.

7. The method for data redundancy as described in Claim 1, wherein said plurality of disk drives comprise spare disks and wherein a) comprises:

maximizing the number of arrays in said plurality of arrays that are arrays in a RAID configuration of three disk drives having redundancy.

8. A method for data redundancy in a data storage system, comprising:

a) grouping a plurality of disk drives into a plurality of arrays having data redundancy to optimize performance, including a first and second array;

b) upon failure of said first array due to a first failed disk drive, dynamically combining disk drives from said first array, excluding said first failed disk drive, with disk drives from said second array to form a first new array having data redundancy in said plurality of arrays.

9. The method for data redundancy as described in Claim 8, wherein said plurality of disk drives comprise spares and wherein a) comprises:

maximizing the number of arrays in said plurality of arrays that are mirrored pairs of disk drives.

10. The method for data redundancy as described in Claim 8, wherein a) comprises:

providing the optimum performance combination as between arrays of mirrored pairs of disk drives, arrays in a RAID configuration of three disk drives having redundancy and arrays in a RAID configuration having more than three disk drives having redundancy in said plurality of arrays.

11. The method for data redundancy as described in Claim 8, wherein b) comprises:

b1) if a first mirrored pair is available, choosing said first mirrored pair to be said second array;

b2) if no arrays of mirrored pairs of disk drives are present in said plurality of arrays, choosing an array having redundancy that has the next smallest number of disk drives to be said second array; and

b3) combining disk drives from said first array with disk drives from said second array to form said first new array in a RAID configuration having data redundancy in said plurality of arrays.

12. The method for data redundancy as described in Claim 8, further comprising:

c) upon failure of said first new array due to a second failed disk drive, if a first mirrored pair is available, choosing said mirrored pair to be a third array in said plurality of arrays;

d) if no arrays of mirrored pairs of disk drives are present, choosing an array having redundancy that has the smallest number of disk drives to be said third array; and

e) upon failure of said first new array, combining disk drives from said first new array, not including said second failed disk drive, with disk drives from said third array, to form a second new array in a RAID configuration having data redundancy in said plurality of arrays.

13. The method for data redundancy as described in Claim 12, further comprising:

c) upon failure of said second new array due to a third failed disk drive, if a second mirrored pair is available, choosing said second mirrored pair to be a fourth array in said plurality of arrays;

d) if no arrays of mirrored pairs of disk drives are present, choosing an array having redundancy that has the smallest number of disk drives to be said fourth array; and

e) combining disk drives from said second new array, not including said third failed disk drive, with disk drives from said fourth array, to form a third new array in a RAID configuration having data redundancy in said plurality of arrays.

14. The method for data redundancy as described in Claim 8, comprising:

c) upon failure of a third array due to a second failed disk drive, if a first mirrored pair is available, choosing said first mirrored pair to be a fourth array in said plurality of arrays;

d) if no arrays of mirrored pairs of disk drives are present, choosing an array having redundancy that has the smallest number of disk drives to be said fourth array; and

e) dynamically combining disk drives from said third array, not including said second failed disk drive, with disk drives from said fourth array to form a second new array in a

RAID configuration having data redundancy in said plurality of arrays.

15. A data storage system, comprising:

a plurality of disk drives comprising spare disks; and

an array controller comprising a processor, and a memory wherein said memory contains instructions that when executed implement a method comprising:

a) grouping a plurality of disk drives into a plurality of arrays having data redundancy to optimize performance, and

b) for every failure of one of said plurality of arrays due to a failed disk drive, dynamically creating a new array having data redundancy in said plurality of arrays and that is optimized for performance, said new array containing information from said failed disk drive.

16. The data storage system as described in Claim 15, wherein b) of said method comprises:

b1) upon failure of a first array in said plurality of arrays due to said first failed disk drive, dynamically choosing a second array in said plurality of arrays that has the smallest number of disk drives as between the remaining arrays, said second array having redundancy;

b2) combining disk drives from said first array, excluding said first failed disk drive, with disk drives from said second array to dynamically form said new array in a

RAID configuration having data redundancy in said plurality of arrays.

17. The data storage system as described in Claim 15, wherein b) of said method comprises:

dynamically creating said new array having data redundancy in said plurality of arrays that is optimized for performance.

18. The data storage system as described in Claim 16, wherein said method further comprises:

configuring said new array in a RAID-4 configuration.

19. The data storage system as described in Claim 16, wherein said method further comprises:

configuring said new array in a RAID-5 configuration.

20. The data storage system as described in Claim 15, wherein said plurality of disk drives comprise spare disks and wherein a) of said method comprises:

maximizing the number of arrays in said plurality of arrays that are mirrored pairs of disk drives.

21. The data storage system as described in Claim 1, wherein said plurality of disk drives comprise spare disks and wherein a) of said method comprises:

maximizing the number of arrays in said plurality of arrays that are arrays in a RAID configuration of three disk drives having redundancy.